AX6F

User's Guide

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AX6F
Mainboard

User's Guide

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FCC Class B Radio Frequency

Declaration of Conformity

This equipment has been tested and found to comply with the limits for a Class B Subassembly -CPU Board device, pursuant to Part 15 of FCC Rules. Operation is subject to the following two conditions: 1. This device may not cause harmful interference, and 2. This device must accept any interference received, including interference that may cause undesired operation.

Equipment Classification	: FCC Class B Subassembly - CPU Board
Type of Product	: Intel Pentium II PCI/ISA ATX Motherboard
CPU Frequencies	: 266/233/200 MHz
Chipset(s)	: Intel 440FX

AOpen **AX6F**

Test To Comply With FCC Standards

FOR HOME OR OFFICE USE

The limits of FCC Part 15 Class B are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

1. Reorient or relocate the receiving antenna.
2. Increase the separation between the equipment and receiver.
3. Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
4. Consult the dealer or an experienced radio/television technician for help.

Notice 1:

The changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Notice 2:

Shielded interface cables, if any, must be used in order to comply with emission limits.

Purpose and Scope

This manual tells how to install and configure the system board.

Organization

Chapter 1, **Overview**, covers the introduction and specifications of the system board and special features.

Chapter 2, **Hardware Installation**, describes hardware jumpers, connectors and memory configuration. There are user friendly drawings to locate jumper and connector.

Chapter 3, **AWARD BIOS**, explains the system BIOS and tells how to configure the system by setting the BIOS parameters.

Chapter 4, **Installing System Component**, includes 3D drawing and step by step procedures for first time DIY user to install the system board, CPU, SIMM/DIMM, cable and add expansion cards.

Appendix A, **Jumper Table Summary**, gives you a tabular summary of the jumper settings discussed in Chapter 2.

Appendix B, **Frequently Asked Question**, collects most frequently asked question of this product.

Appendix C, **Troubleshooting Guide**, includes first aid information you need if you meet trouble, the WWW address and worldwide service telephone/fax are also included.

Appendix D, **AOpen Best Products**, includes the best sale and recommended product specifications of AOpen.

Conventions

The following conventions are used in this manual:

`Text entered by user, default settings, recommended selections`	Represent text input by the user, default settings and recommended selections
<Enter>, <Tab>,<Ctl>, <Alt>, <Ins>, <Del>, etc	Represent the actual keys that you have to press on the keyboard.

Note:
Gives bits and pieces of additional information related to the current topic.

Warning:
Alerts you to any damage that might result from doing or not doing specific actions.

Caution:
Suggests precautionary measures to avoid potential hardware or software problems.

Important:
Reminds you to take specific action relevant to the accomplishment of the procedure at hand.

Tip:
Tells how to accomplish a procedure with minimum steps through little shortcuts.

Contents

Chapter 1 Overview

1.1 Specifications.....1-2

1.2 CPU Thermal Protection.....1-3

Chapter 2 Hardware Installation

2.1 Jumper and Connector Locations.....2-1

2.2 Jumpers.....2-4

2.3 Connectors.....2-8

2.4 Configuring the System Memory.....2-16

2.5 PCI Slot.....2-21

Chapter 3 AWARD BIOS

3.1 Entering the BIOS Setup.....3-1

3.2 Standard CMOS Setup.....3-3

3.3 BIOS Features Setup.....3-6

3.4 Chipset Features Setup.....3-12

3.5 Power Management Setup.....3-19

3.6 PnP/PCI Configuration Setup.....3-23

3.7 Load Setup Default.....3-27

3.8 Load Turbo Default.....3-27

3.9 Integrated Peripherals.....3-28

3.10 Password Setting.....3-34

3.11 IDE HDD Auto Detection.....3-34

3.12 Save & Exit Setup.....3-34

3.13 Exit without Saving.....3-35

3.14 NCR SCSI BIOS and Driver.....3-35

3.15 AWARD BIOS Flash Utility.....3-35

Chapter 4 Installing System Component

4.1 Installing Memory Module.....4-1

4.2 Installing or Upgrading Pentium II.....4-4

4.3 Installing the System Board.....4-5

4.4 Accesory Bracket and Cables.....4-6

4.5 Installing Add-on Cards.....4-9

Appendix A **Jumper Table Summary**

Appendix B **Frequently Asked Question**

Appendix C **Troubleshooting**

Appendix D **AOpen Best Products**

Chapter 1

Overview

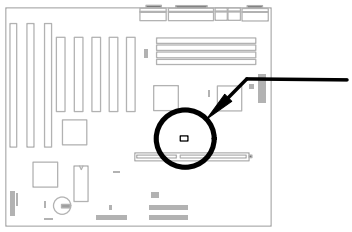
The AX6F is a high-performance Pentium II (Klamath) based system board that utilizes the PCI/ISA architecture and **ATX** form factor. It integrates the Intel **82440FX** PCIset, a **Ultra I/O controller**, and a PCI mode 4 enhanced IDE controller with bus master to enhance system performance. It has **four single in-line memory module (SIMM)** that allows memory up to a maximum of **512MB.** There is no second level cache onboard, since the cache is on the **Pentium II CPU card (connector SLOT1).**

Another feature that AX6F has implemented is **CPU Thermal Protection**. A special circuit is under the CPU heatsink, when temperature is higher than 55 degree C, the CPU speed will automatically slow down and there will be warning from BIOS and also ADM (Advanced Desktop Manager, similar as Intel LDCM), if ADM is installed.

1.1 Specifications

Form Factor	ATX
Board Size	305 mm x 244 mm
CPU	Intel Pentium II (Klamath) Processor
System Memory	FPM (Fast Page Mode) or EDO (Extended Data Output) 72-pin SIMM x4 maximum 512MB.
Second-level Cache	On the CPU card (Slot1 connector)
Chipset	Intel 82440FX PCIset
Expansion Slots	ISA x4 and PCI x5
Serial Port	Two serial ports UART 16C550 compatible
Parallel Port	One parallel port supports standard parallel port (SPP), enhanced parallel port (EPP) or extended capabilities port (ECP).
Floppy Interface	Floppy interface supports 3.5 inches drives with 720KB, 1.44MB or 2.88MB format or 5.25 inches drives with 360KB, 1.2MB format
IDE Interface	Dual-channel IDE interface support maximum 4 IDE hard disks or CDROM, mode 4 , bus master hard disk drives.
USB Interface	Two USB ports supported by USB bracket, the BIOS also supports USB driver to simulate legacy keyboard.
PS/2 Mouse	Mini-Din PS/2 mouse connector onboard.
Keyboard	Mini-Din PS/2 keyboard connector onboard.
RTC and Battery	RTC within Super I/O controller. Battery is Lithium (CR-2032).
BIOS	AWARD Plug-and-Play Flash ROM BIOS
CPU Thermal Protection	Alarm and slow down CPU speed when temperature is high than 55 degree C.

1.2 CPU Thermal Protection



This mainboard implements special thermal protection circuit under the CPU heatsink. When temperature is higher than 55 degree C, the CPU speed will automatically slow down and there will be warning from BIOS and also ADM (Advanced Desktop Manager, similar as Intel LDCM), if ADM is installed.

It is automatically implemented by BIOS and ADM, no hardware installation is needed.

To use CPU Thermal Monitoring:

1. Go into BIOS setup, Integrated Peripherals → CPU Thermal (Temp.), select Monitor.
2. Install ADM.

Chapter 2

Hardware Installation

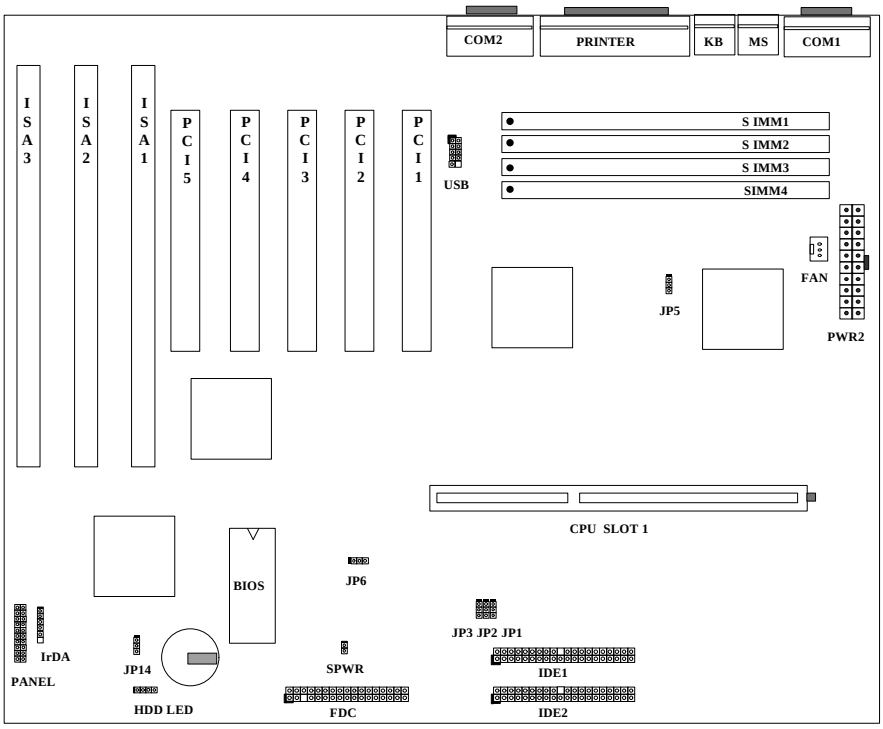
This chapter gives you a step-by-step procedure on how to install your system. Follow each section accordingly.

Caution: *Electrostatic discharge (ESD) can damage your processor, disk drives, expansion boards, and other components. Always observe the following precautions before you install a system component.*

1. *Do not remove a component from its protective packaging until you are ready to install it.*
2. *Wear a wrist ground strap and attach it to a metal part of the system unit before handling a component. If a wrist strap is not available, maintain contact with the system unit throughout any procedure requiring ESD protection.*

2.1 Jumper and Connector Locations

The following figure shows the locations of the jumpers and connectors on the system board:



Jumpers:

JP1,JP2,JP3:	*CPU frequency ratio*
JP5:	*CPU bus clock (chipset)*
JP6:	*CPU bus clock (clock generator)*
JP14:	*Clear CMOS*

Connectors:

PS2 MS:	*PS/2 mouse connector*
KB2:	*PS/2 keyboard connector*
COM1:	*COM1 connector*
COM2:	*COM2 connector*
PRINTER:	*Printer connector*
PWR2:	*ATX power connector*
USB:	*USB connector*
FDC:	*Floppy drive connector*
IDE1:	*IDE1 primary channel*
IDE2:	*IDE2 secondary channel*
FAN:	*CPU fan connector*
IrDA:	*IrDA (Infrared) connector*
HDD LED:	*HDD LED connector*
PANEL:	*Front panel (Multifunction) connector*

2.2 Jumpers

Jumpers are made by pin headers and plastic connecting caps for the purpose of customizing your hardware. Doing so requires basic knowledge of computer hardware, be sure you understand the meaning of the jumpers before you change any setting. The onboard jumpers are normally set to their default with optimized settings.

On the mainboard, normally there is a bold line marked beside pin 1 of the jumper, sometimes, there are numbers also. If we connect (short) plastic cap to pin 1 and 2, we will say set it at 1-2, and when we say jumper is open, that means no plastic cap connected to jumper pins.

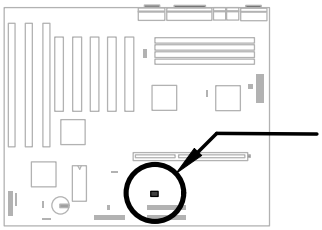
Open Short Jumper set at 1-2 Jumper set at 2-3

2.2.1 Selecting the CPU Frequency

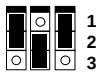
JP1	JP2	JP3	CPU Frequency Ratio
2-3	1-2	2-3	1.5x
1-2	1-2	1-2	2x
1-2	1-2	2-3	2.5x
1-2	2-3	1-2	3x
1-2	2-3	2-3	3.5x
2-3	1-2	1-2	4x
2-3	1-2	2-3	4.5x
2-3	2-3	1-2	5x
2-3	2-3	2-3	5.5x
1-2	1-2	1-2	6x
1-2	1-2	2-3	6.5x
1-2	2-3	1-2	7x
1-2	2-3	2-3	7.5x
2-3	1-2	1-2	8x

Intel Pentium II (Klamath) is designed to have different Internal (Core) and External (Bus) frequency. The ratio of Core/Bus frequency is selected by **JP1, JP2** and **JP3**, which CPU is using to multiply external clock and produce internal frequency.

Core frequency = Ratio * External bus clock

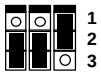


JP3 & JP2 & JP1



3x

JP3 & JP2 & JP1

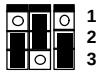


3.5x

JP3 & JP2 & JP1

4x

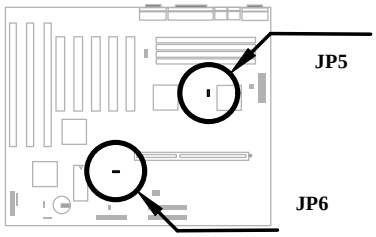
JP3 & JP2 & JP1



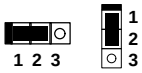
4.5x

JP6	JP5	CPU External Clock
1-2	1-2	66MHz (default)
2-3	2-3	60MHz

JP6 and **JP5** are selection of CPU external clock (bus clock). **JP6** is actually the selection of clock from clock generator and **JP5** is used to inform chipset the CPU bus clock.

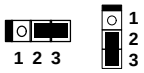


JP6 & JP5



66MHz
(default)

JP6 & JP5



60MHz

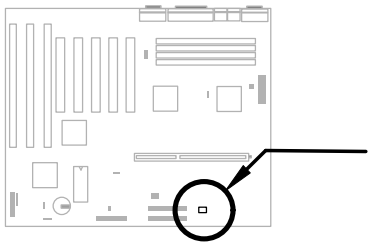
Caution: *Following table are possible settings of current CPU available on the market. The correct setting may vary because of new CPU product, refer to your CPU specification for more details.*

INTEL Pentium II	CPU Core Frequency	Ratio	External Bus Clock	JP3 & JP2 & JP1	JP6 & JP5
Klamath 200	200MHz =	3x	66MHz	1-2 & 2-3 & 1-2	1-2 & 1-2
Klamath 233	233MHz =	3.5x	66MHz	2-3 & 2-3 & 1-2	1-2 & 1-2
Klamath 266	266MHz =	4x	66MHz	1-2 & 1-2 & 2-3	1-2 & 1-2

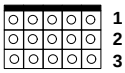
2.2.2 Setting the CPU Voltage

JP7~JP11	CPU Core Voltage
Open	CPU voltage auto-detection (default)

JP7~JP11 is reserved for test only and will be removed after mass production. This mainboard supports Pentium II (Klamath) VID function, the CPU core voltage is automatic detected, the range is from 1.3V to 3.5V.



JP11,JP10,JP9,JP8,JP7

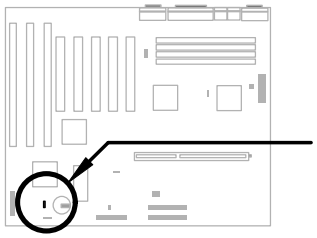


Open for Auto-detection

2.2.3 Clearing the CMOS

JP14	Clear CMOS
1-2	Normal operation (default)
2-3	Clear CMOS

You need to clear the CMOS if you forget your system password. To clear the CMOS, follow the procedures listed below:



Normal Operation (default)

Clear CMOS

The procedure to clear CMOS:

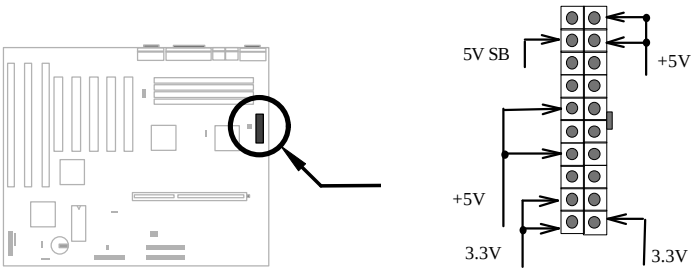
1. Turn off the system power.
2. Remove ATX power cable from connector PWR2.
3. Locate **JP14** and short pins 2-3 for a few seconds.
4. Return **JP14** to its normal setting by shorting pins 1-2.
5. Connect ATX power cable back to connector PWR2.
6. Turn on the system power.
7. Press DEL during bootup to enter the BIOS Setup Utility and specify a new password, if needed.

2.3 Connectors

2.3.1 Power Cable

The ATX power supply uses 20-pin connector shown below. Make sure you plug in the right direction.

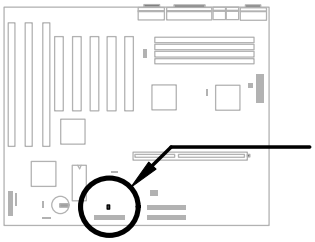
Caution: *Make sure that the power supply is off before connecting or disconnecting the power cable.*



PWR2

2.3.2 ATX Soft-Power Switch Connector

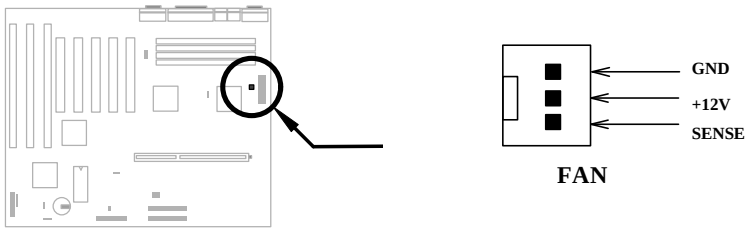
The ATX soft-power switch connector is a 2-pin header on the system board. Locate the power switch cable from your ATX housing. It is 2-pin female connector from the housing front panel. Plug this connector to the soft-power switch connector marked **SPWR.**



SPWR

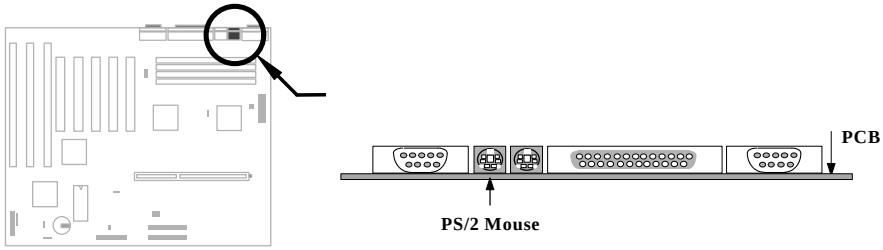
2.3.3 CPU Fan

Plug in the fan cable to the two-pin fan connector onboard. The fan connector is marked **FAN** on the system board.



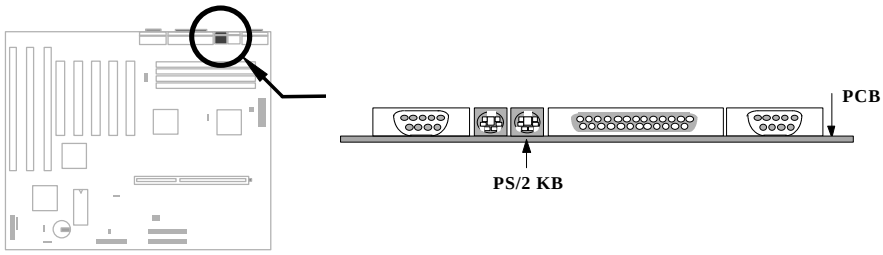
2.3.4 PS/2 Mouse

The onboard PS/2 mouse connector is a 6-pin Mini-Din connector marked **PS2 MS**. The view angle of drawing shown here is from back panel of the housing.



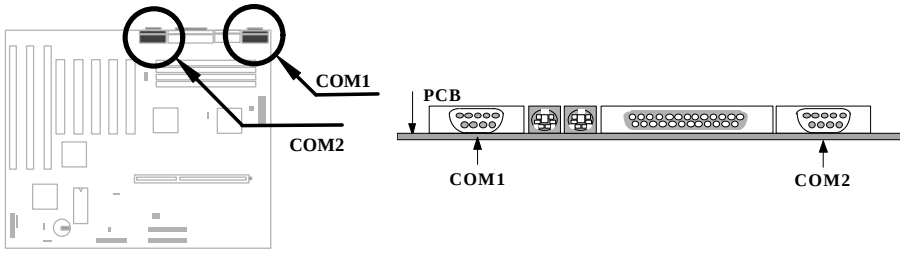
2.3.5 Keyboard

The onboard PS/2 keyboard connector is a 6-pin Mini-Din connector marked **KB2**. The view angle of drawing shown here is from back panel of the housing.



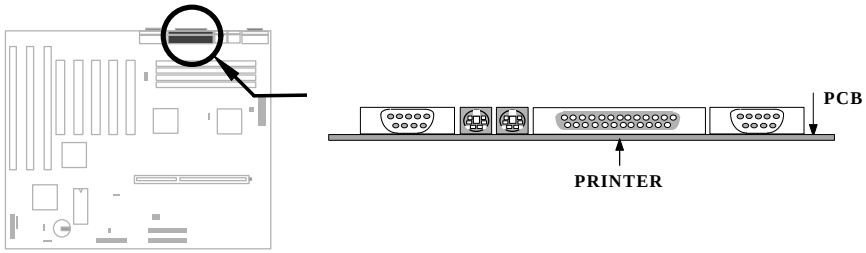
2.3.6 Serial Devices (COM1/COM2)

The onboard serial connectors are 9-pin D-type connector on the back panel of mainboard. The serial port 1 connector is marked as **COM1** and the serial port 2 connector is marked as **COM2.**



2.3.7 Printer

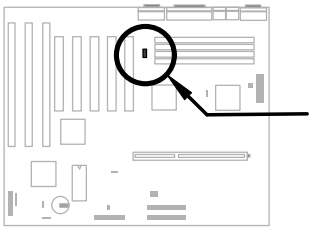
The onboard printer connector is a 25-pin D-type connector marked **PRINTER**. The view angle of drawing shown here is from back panel of the housing.

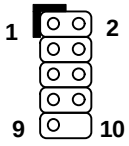


2.3.8 USB Device

You need a USB bracket to have your system to support additional USB device(s). To attach a USB bracket, simply insert the bracket cable to the onboard USB connector marked as **USB.**

Pin	Description	Pin	Description
1	V0	2	V1
3	D0-	4	D1-
5	D0+	6	D1+
7	GND	8	GND
9	NC	10	NC

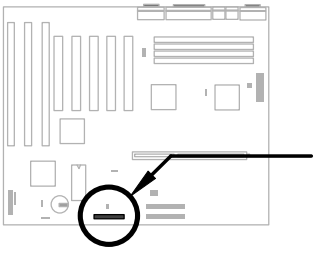


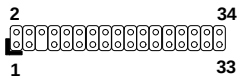


USB

2.3.9 Floppy Drive

Connect the 34-pin floppy drive cable to the floppy drive connector marked as **FDC** on the system board.





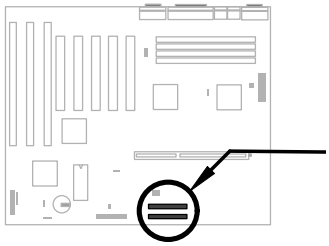
FDC

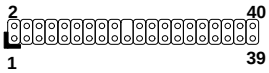
2.3.10 IDE Hard Disk and CD ROM

This mainboard supports two 40 pin IDE connectors marked as **IDE1** and **IDE2.** IDE1 is also known as primary channel and IDE2 as secondary channel, each channel supports two IDE devices that makes total of four devices.

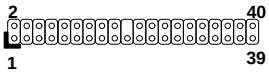
In order to work together, the two devices on each channel must be set differently to master and slave mode, either one can be hard disk or CDROM. The setting as master or slave mode depends on the jumper on your IDE device, please refer to your hard disk and CDROM manual accordingly.

Connect your first IDE hard disk to master mode of the primary channel. If you have second IDE device to install in your system, connect it as slave mode on the same channel, and the third and fourth device can be connected on secondary channel as master and slave mode respectively.





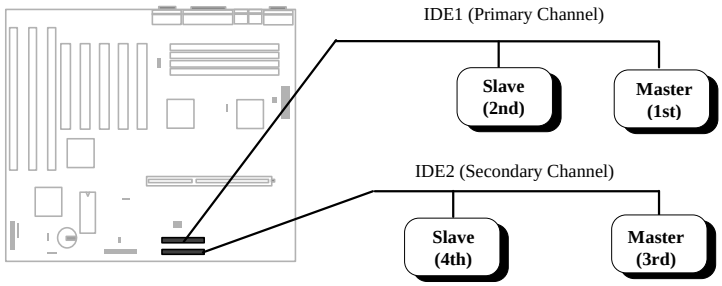
IDE1



IDE2

***Caution**: The specification of IDE cable is maximum 46cm (18 inches), make sure your cable does not excess this length.*

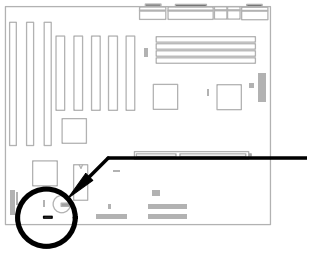
***Caution:** For better signal quality, it is recommended to set far end side device to master mode and follow the suggested sequence to install your new device . Please refer to following figure.*

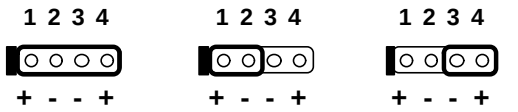


2.3.11 Hard Disk LED

The HDD LED connector is marked as **HDD LED** on the board. This connector is designed for different type of housing, actually only two pins are necessary for the LED. If your housing has four pin connector, simply plug it in. If you have only two pin connector, please connect to pin 1-2 or pin 3-4 according to the polarity.

Pin	Description
1	HDD LED
2	GND
3	GND
4	HDD LED





HDD LED
4-pin connector

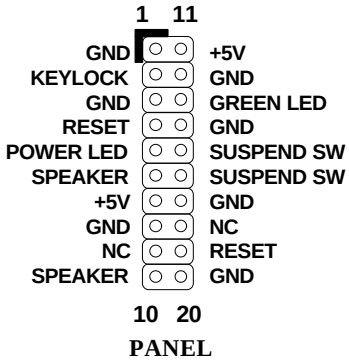
HDD LED
2-pin connector at pin 1-2

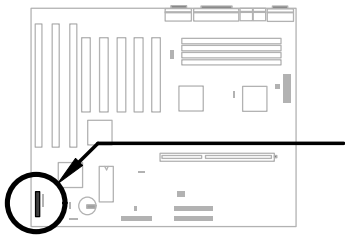
HDD LED
2-pin connector at pin 3-4

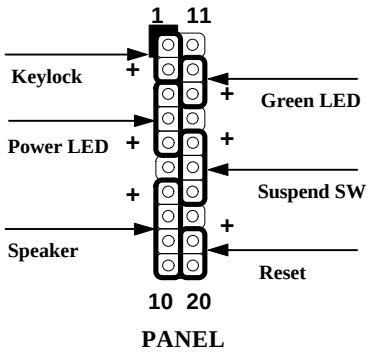
2.3.12 Panel Connector

The Panel (multifunction) connector is a 20-pin connector marked as **PANEL** on the board. Attach the power LED, keylock, speaker, reset switch, suspend switch, and green mode LED connectors to the corresponding pins as shown in the figure.

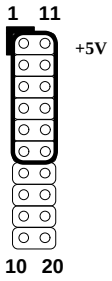
Some housings have a five-pin connector for the keylock and power LED Since power LED and keylock are aligned together, you can still use this kind of connector.







Other housings may have a 12-pin connector. If your housing has this type of connector, connect it to PANEL as shown in the figure. Make sure that the red wire of the connector is connected to +5V.



Note: *If your housing comes with Turbo switch and Turbo LED connectors, you may use these connectors for Suspend switch and Green mode LED functions, respectively.*

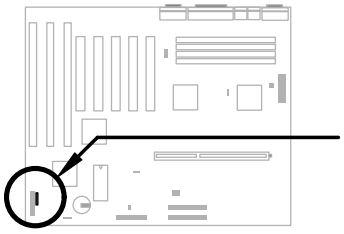
Note*: Pressing the Suspend switch allows you to manually force the system to suspend mode. However, this is possible only if the Power Management function in the BIOS Setup menu is enabled.*

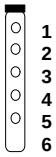
2.3.13 IrDA Connector

The IrDA connector can be configured to support wireless infrared module, with this module and application software such as Laplink or Win95 Direct Cable Connection, user can transfer files to or from laptops, notebooks, PDA and printers. This connector supports HPSIR (115.2Kbps, 2 meters), ASK-IR (19.2Kbps) and Fast IR (4Mbps, 2 meters).

Install infrared module onto **IrDA** connector and enable infrared function from BIOS setup, make sure to have correct orientation when you plug onto IrDA connector.

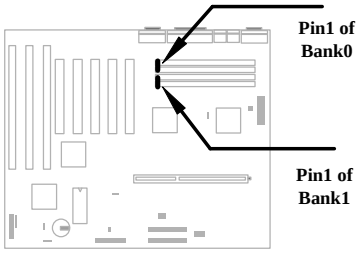
Pin	Description
1	+5V
2	FIRRX
3	IRRX
4	GND
5	IRTX
6	NC





IrDA

2.4 Configuring the System Memory



This mainboard has four 72 pin SIMM sockets (Single-in-line Memory Module) that allow you to install system memory from minimum 4MB up to maximum 512MB.

The SIMM supported by this mainboard can be identified by 4 kinds of factors:

- Size: single side, 1Mx32 (4MB), 4Mx32 (16MB), 16Mx32 (64MB), and double side, 1Mx32x2 (8MB), 4Mx32x2 (32MB), 16Mx32x2 (128MB).
- Speed: 60ns or 70ns access time
- Type: FPM (Fast page mode) or EDO (Extended data output)
- Parity: without parity (32 bit wide) or with parity (36 bit wide).

Because Pentium II processor has 64 bit bus width, the four SIMM sockets are arranged in two banks of two sockets each, they are Bank0 and Bank1. Both SIMMs in each bank must be in the same size and type. It is allowed to have different speed and type in different bank, for example, 70ns FPM in one bank and 60ns EDO in another bank, in such case, each bank is independently optimized for maximum performance. The memory timing requires at least 70ns fast page mode DRAM chip, but for optimum performance, 60ns EDO DRAM is recommended.

***Warning**: The default memory timing setting is 60ns to obtain the optimal performance. Because of the specification limitation, 70ns SIMM is recommended to be used only for CPU external clock 60MHz.*

***Tip:** EDO DRAM is designed to improve the DRAM read performance. Unlike traditional fast page mode, that tri-states the memory output data to start the precharge activity, EDO DRAM holds the memory data valid until the next memory access cycle, which is similar to pipe-line effect and reduces one clock state.*

There is no jumper setting required for the memory size or type. It is automatically detected by the system BIOS. You can use any single side SIMM combination list below for, and the total memory size is to add them together, the maximum is 512MB.

SIMM1	SIMM2	Subtotal of Bank0
None	None	0MB
4MB	4MB	8MB
8MB	8MB	16MB
16MB	16MB	32MB
32MB	32MB	64MB
64MB	64MB	128MB
128MB	128MB	256MB

SIMM3	SIMM4	Subtotal of Bank1
None	None	0MB
4MB	4MB	8MB
8MB	8MB	16MB
16MB	16MB	32MB
32MB	32MB	64MB
64MB	64MB	128MB
128MB	128MB	256MB

Total Memory Size = Subtotal of Bank0 + Subtotal of Bank1

Caution: *Make sure that you install the same SIMM type and size for each bank.*

The driving capability of new generation chipset is limited because the lack of memory buffer (to improve performance). This makes DRAM chip count an important factor to be taking into consideration when you install SIMM. Unfortunately, there is no way that BIOS can identified the correct chip count, you need to calculate the chip count by yourself. The simple rule is: By visual inspection, use only SIMM with chip count less than 24 chips.

***Warning**: Do not install any SIMM that contains more than 24 chips. SIMMs contain more than 24 chips exceed the chipset driving specification. Doing so may result in unstable system behavior.*

***Tip:** The SIMM chip count can be calculated by following example:*

1. *For 32 bit non-parity SIMM using 1M by 4 bit DRAM chip, 32/4=8 chips.*
2. *For 36 bit parity SIMM using 1M by 4 bit DRAM chip, 36/4=9 chips.*
3. *For 36 bit parity SIMM using 1M by 4 bit and 1M by 1 bit DRAM, the chip count will be 8 data chips(8= 32/4) plus 4 parity chips(4=4/1), total is 12 chips.*

Following table list the recommended DRAM combinations:

SIMM Data chip	SIMM Parity chip	Bit size per side	Single/ Double side	Chip count	SIMM size	Recommended
1M by 4	None	1Mx32	x1	8	4MB	Yes
1M by 4	None	1Mx32	x2	16	8MB	Yes
1M by 4	1M by 1	1Mx36	x1	12	4MB	Yes
1M by 4	1M by 4	1Mx36	x1	9	4MB	Yes
1M by 4	1M by 4	1Mx36	x2	18	8MB	Yes
1M by 16	None	1Mx32	x1	2	4MB	Yes
1M by 16	None	1Mx32	x2	4	8MB	Yes
1M by 16	1M by 4	1Mx36	x1	3	4MB	Yes
1M by 16	1M by 4	1Mx36	x2	6	8MB	Yes
4M by 4	None	4Mx32	x1	8	16MB	Yes
4M by 4	None	4Mx32	x2	16	32MB	Yes
4M by 4	4M by 1	4Mx36	x1	12	16MB	Yes
4M by 4	4M by 1	4Mx36	x2	24	32MB	Yes

SIMM Data chip	SIMM Parity chip	Bit size per side	Single/ Double side	Chip count	SIMM size	Recommended
16M by 4	None	16Mx32	x1	8	64MB	Yes, but not tested.
16M by 4	None	16Mx32	x2	16	128MB	Yes, but not tested.
16M by 4	16M by 4	16Mx36	x1	9	64MB	Yes, but not tested.
16M by 4	16M by 4	16Mx36	x2	18	128MB	Yes, but not tested.

***Warning**: 64MB SIMMs using 16M by 4 bit chip (64M bit technology) are not available in the market and are not formally tested by AOpen quality test department yet. However they are supported by design specification of chipset and they will be tested as soon as they are available. Note that 64MB SIMMs using 16M by 1 bit chip (16M bit technology) have chip count exceed 24 and are strongly not recommended.*

***Tip:** 8 bit = 1 byte, 32 bit = 4 byte. The SIMM size is represented by number of data byte (whether with or without parity), for example, the size of single side SIMM using 1M by 4 bit chip is 1Mx32 bit, that is, 1M x 4 byte = 4MB. For double side SIMM, simply multiply it by 2, that is, 8MB.*

Following table are possible DRAM combinations that is **NOT** recommended:

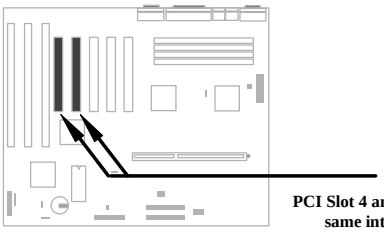
SIMM Data chip	SIMM Parity chip	Bit size per side	Single/ Double side	Chip count	SIMM size	Recommended
1M by 1	None	1Mx32	x1	32	4MB	No
1M by 1	1M by 1	1Mx36	x1	36	4MB	No
1M by 4	1M by 1	1Mx36	x2	24	8MB	No
4M by 1	None	4Mx32	x1	32	16MB	No
4M by 1	4M by 1	4Mx36	x1	36	16MB	No
16M by 1	None	16Mx32	x1	32	64MB	No
16M by 1	16M by 1	16Mx36	x1	36	64MB	No

Memory error checking is supported by two modes, parity check or ECC (Error Check and Correction). To use memory error check you need 36 bit SIMM (32 bit data + 4 bit parity or ECC bit). 36 bit parity or ECC SIMMs are automatically detected by BIOS, however you must enter BIOS setup to configure the memory for either parity or ECC mode.

Tip: *The parity mode uses 1 parity bit for each byte, normally it is even parity mode, that is, each time the memory data is updated, parity bit will be adjusted to have even count "1" for each byte. When next time, if memory is read with old number of "1", the parity error is occurred and this is called single bit error detection.*

Tip: *The ECC mode needs 8 ECC bit for 64 bit data, because 36 bit SIMM has 4 bit more for parity, the ECC mode can be supported by two traditional parity SIMMs, it is no need to have special ECC SIMM. Each time memory is accessed, ECC bits are updated and checked by special algorithm, the ECC algorithm has the ability to detect double bit error and automatically correct single bit error.*

2.5 PCI Slot



PCI Slot 4 and Slot 5 share the same interrupt INTD.

Each PCI slot has four PCI interrupts aligned as listed in the table below. Most of the PCI cards use only one interrupt at location 1 (pin A6), because the chipset supports only 4 PCI interrupts. PCI slot 4 and PCI slot 5 share the same interrupt INTD.

Tip: *Since normally PCI VGA does not use interrupt, you may plug VGA card at either slot 4 or slot 5, and the other slot can be used for another PCI card.*

PCI Slot	Location 1 (pin A6)	Location 2 (pin B7)	Location 3 (pin A7)	Location 4 (pin B8)
Slot 1	INTA	INTB	INTC	INTD
Slot 2	INTB	INTC	INTD	INTA
Slot 3	INTC	INTD	INTA	INTB
Slot 4	INTD	INTA	INTB	INTC
Slot 5	INTD	INTA	INTB	INTC

Note: *The onboard USB ports share PCI INTD too. If you enable "USB Host Controller" in BIOS setup, INTD will be occupied by USB port. That is, PCI slot 4 and slot 5 can only use PCI card that does not need interrupt, such as VGA.*

Chapter 3

Award BIOS

This chapter tells how to configure the system parameters. You may update your BIOS via AWARD Flash Utility.

Important: *Because the BIOS code is the most often changed part of the mainboard design, the BIOS information contained in this chapter (especially the Chipset Setup parameters) may be a little different compared to the actual BIOS that came with your mainboard.*

3.1 Entering the Award BIOS Setup Menu

The BIOS setup utility is a segment of codes/routines residing in the BIOS Flash ROM. This routine allows you to configure the system parameters and save the configuration into the 128 byte CMOS area, (normally in the RTC chip or directly in the main chipset). To enter the BIOS Setup, press DEL during POST (Power-On Self Test). The BIOS Setup Main Menu appears as follows.

```
ROM PCI/ISA BIOS (XXXXXXXX)
CMOS SETUP UTILITY
AWARD SOFTWARE, INC.
```

STANDARD CMOS SETUP	INTEGRATED PERIPHRALS
BIOS FEATURES SETUP	PASSWORD SETTING
CHIPSET FEATURES SETUP	IDE HDD AUTO DETECTION
POWER MANAGEMENT SETUP	SAVE & EXIT SETUP
PNP/PCI CONFIGURATION SETUP	EXIT WITHOUT SAVING
LOAD SETUP DEFAULTS	
LOAD TURBO DEFAULTS	
ESC : Quit	↑ ↓ → ← : Select Item
F10 : Save & Exit Setup	(Shift) F2 : Change Color
Description of each function	

***Tip**: Choose "Load Setup Defaults" for recommended optimal performance. Choose "Load Turbo Defaults" for best performance with light system loading. Refer to section 3.7.*

The section at the bottom of the screen tells how to control the screen. Use the arrow keys to move between items, SHIFT F2 to color scheme of the display, ESC to exit, and F10 to save the changes before exit. Another section at the bottom of the screen displays a brief description of the highlighted item.

After selecting an item, press ENTER to select or enter a submenu.

3.2 Standard CMOS Setup

The "Standard CMOS Setup" sets the basic system parameters such as the date, time, and the hard disk type. Use the arrow keys to highlight an item and PGUP or PGDN to select the value for each item.

```
                ROM PCI/ISA BIOS (XXXXXXXX)
                    STANDARD CMOS SETUP
                AWARD SOFTWARE, INC.

Date (mm:dd:yy)  :  Wed.  Mar  6  1996
Time (hh:mm:ss)  :  00:00:00

HARD DISK         TYPE     SIZE    CYLS   HEAD    PRECOMP   LANDZ   SECTORS   MODE
Primary Master  : Auto        0       0      0          0       0         0   AUTO
Primary Slave   : Auto        0       0      0          0       0         0   AUTO
Secondary Master: Auto        0       0      0          0       0         0   AUTO
Secondary Slave : Auto        0       0      0          0       0         0   AUTO

Drive A :  1.44M, 3.5 in
Drive B :  None

Video   :  EGA/VGA
Halt On :  All Errors

                                    Base Memory :    640 K
                                  Extended Memory:   15360 K
                                    Other Memory :     384 K
                                   Total Memory :   16384 K

 ESC  :  Quit                    ↑ ↓ → ← :  Select Item
 F10  :  Save & Exit Setup     (Shift) F2  :  Change Color
```

Standard CMOS → Date

To set the date, highlight the Date parameter. Press PGUP or PGDN to set the current date. The date format is month, date, and year.

Standard CMOS → Time

To set the time, highlight the Time parameter. Press PGUP or PGDN to set the current time in hour, minute, and second format. The time is based on the 24 hour military clock.

Standard CMOS→ Primary Master→ Type
Standard CMOS→ Primary Slave→ Type
Standard CMOS→ Secondary Master→ Type
Standard CMOS→ Secondary Slave→ Type

Type
Auto
User
None
1
2
...
45

This item lets you select the IDE hard disk parameters that your system supports. These parameters are Size, Number of Cylinder, Number of Head, Start Cylinder for Pre-compensation, Cylinder number of Head Landing Zone and Number of Sector per Track. The default setting is **Auto**, which enables BIOS to automatically detect the parameters of installed HDD at POST (Power-On Self Test). If you prefer to enter HDD parameters manually, select User. Select None if no HDD is connected to the system.

The IDE CDROM is always automatically detected.

Tip: *For an IDE hard disk, we recommend that you use the "IDE HDD Auto Detection" to enter the drive specifications automatically. See the section "IDE HDD Auto Detection".*

Standard CMOS→ Primary Master→ Mode
Standard CMOS→ Primary Slave→ Mode
Standard CMOS→ Secondary Master→ Mode
Standard CMOS→ Secondary Slave→ Mode

Mode
Auto
Normal
LBA
Large

The enhanced IDE feature allows the system to use a hard disk with a capacity of more than 528MB. This is made possible through the Logical Block Address (LBA) mode translation. The LBA is now considered as a standard feature of current IDE hard disk on the market because of its capability to support capacity larger than 528MB. Note that if HDD is formatted with LBA On, it will not be able to boot with LBA Off.

Standard CMOS→ Drive A
Standard CMOS→ Drive B

Drive A
None
360KB 5.25"
1.2MB 5.25"
720KB 3.5"
1.44MB 3.5"
2.88MB 3.5"

These items select floppy drive type. The available settings and types supported by the mainboard are listed on the left.

Standard CMOS → Video

Video
EGA/VGA
CGA40
CGA80
Mono

This item specifies the type of video card in use. The default setting is VGA/EGA . Since current PCs use VGA only, this function is almost useless and may be disregarded in the future.

Standard CMOS → Halt On

Halt On
No Errors
All Errors
All, But Keyboard
All, But Diskette
All, But Disk/Key

This parameter enables you to control the system stops in case of Power-On Self Test (POST) error.

3.3 BIOS Features Setup

This screen appears when you select the option "BIOS Features Setup" from the main menu.

```
ROM PCI/ISA BIOS (XXXXXXXX)
BIOS FEATURES SETUP
AWARD SOFTWARE, INC.
```

Virus Warning	: Disabled	Video BIOS Shadow	: Enabled
External Cache	: Enabled	C8000-CBFFF Shadow	: Disabled
Quick Power On Self Test	: Enabled	CC000-CFFFF Shadow	: Disabled
Boot Sequence	: A,C,SCSI	D0000-D3FFF Shadow	: Disabled
Swap Floppy Drive	: Disabled	D4000-D7FFF Shadow	: Disabled
Boot Up Floppy Seek	: Disabled	D8000-DBFFF Shadow	: Disabled
Boot Up NumLock Status	: ON	DC000-DFFFF Shadow	: Disabled
Boot Up System Speed	: High		
Typematic Rate Setting	: Disabled		
Typematic Rate (Chars/Sec)	: 6	ESC: Quit	↑↓→← : Select Item
Typematic Delay (Msec)	: 250	F1 : Help	PU/PD/+/- : Modify
Security Option	: Setup	F5 : Old Values	(Shift) F2 : Color
PCI/VGA Palette Snoop	: Disabled	F6 : Load Setup Defaults	
OS Select for DRAM > 64MB	: Non-OS/2	F7 : Load Turbo Defaults	

BIOS Features→ Virus Warning

Virus Warning
Enabled
Disabled

Set this parameter to Enabled to activate the warning message. This feature protects the boot sector and partition table of your hard disk from virus intrusion.

Any attempt during boot up to write to the boot sector of the hard disk drive stops the system and the following warning message appears on the screen. Run an anti-virus program to locate the problem.

```
! WARNING !
Disk Boot Sector is to be modified
Type "Y" to accept write, or "N" to abort write
Award Software, Inc.
```

BIOS Features→ External Cache

External Cache
Enabled
Disabled

Enabling this parameter activates the secondary cache (currently, PBSRAM cache). Disabling the parameter slows down the system. Therefore, we recommend that you leave it enabled unless you are troubleshooting a problem.

BIOS Features→ Power-On Self-Test

Quick Power-on Self-test
Enable
Disabled

This parameter speeds up POST by skipping some items that are normally checked.

BIOS Features→ Boot Sequence

Boot Sequence
A,C,SCSI
C,A,SCSI
C,CDROM,A
CDROM,C,A
D,A,SCSI
E,A,SCSI
F,A,SCSI
SCSI,A,C
SCSI,C,A
C only

This parameter allows you to specify the system boot up search sequence. The hard disk ID are listed below:

C: Primary master

D: Primary slave

E: Secondary master

F: Secondary slave

BIOS Features→ Swap Floppy Drive

Swap Floppy Drive
Enabled
Disabled

This item allows you to swap floppy drives. For example, if you have two floppy drives (A and B), you can assign the first drive as drive B and the second drive as drive A or vice-versa.

BIOS Features→ Boot-up Floppy Seek

Boot-up Floppy Seek
Enabled
Disabled

When enabled, the BIOS issues the seek command to the floppy drive during POST to move floppy drive head forward and backward.

BIOS Features→ Boot-up NumLock Status

Boot-up NumLock Status
On
Off

Setting this parameter to On enables the numeric function of the numeric keypad. Set this parameter to Off to disregard the function. Disabling the numeric function allows you to use the numeric keypad for cursor control.

BIOS Features→ Boot-up System Speed

Boot-up System Speed
High
Low

Select High or Low system speed after boot.

BIOS Features→ Typematic Rate Setting

Typematic Rate Setting
Enabled
Disabled

Set this parameter to Enable/Disable the keyboard repeat function. When enabled, continually holding down a key on the keyboard will generate repeatedly keystrokes.

BIOS Features→ Typematic Rate

Typematic Rate
6
8
10
12
15
20
24
30

This item allows you to control the speed of repeated keystrokes. The default is `30 characters/sec` .

BIOS Features→ Typematic Delay

Typematic Delay
250
500
750
1000

This parameter allows you to control the delay time between the first and the second keystroke (where the repeated keystrokes begin). The typematic delay settings are 250, 500, 750, and 1000 msec.

BIOS Features→ Security Option

Security Option
Setup
System

The **System** option limits access to both the System boot and BIOS setup. A prompt asking you to enter your password appears on the screen every time you boot the system.

The **Setup** option limits access only to BIOS setup.

To disable the security option, select Password Setting from the main menu, don't type anything and just press <Enter>.

BIOS Features→ PCI/VGA Palette Snoop

PCI/VGA Palette Snoop
Enabled
Disabled

Enabling this item informs the PCI VGA card to keep silent (and to prevent conflict) when palette register is updated (i.e., accepts data without responding any communication signals). This is useful only when two display cards use the same palette address and plugged in the PCI bus at the same time (such as MPEQ or Video capture). In such case, PCI VGA is silent while MPEQ/Video capture is set to function normally.

BIOS Features→ OS Select for DRAM > 64MB

OS Select for DRAM > 64MB
OS/2
Non-OS/2

Set to OS/2 if your system is utilizing an OS/2 operating system and has a memory size of more than 64 MB.

BIOS Features→ Video BIOS Shadow

Video BIOS Shadow
Enabled
Disabled

VGA BIOS Shadowing means to copy video display card BIOS into the DRAM area. This enhances system performance because DRAM access time is faster than ROM.

BIOS Features → C800-CBFF Shadow
BIOS Features → CC00-CFFF Shadow
BIOS Features → D000-D3FF Shadow
BIOS Features → D400-D7FF Shadow
BIOS Features → D800-DBFF Shadow
BIOS Features → DC00-DFFF Shadow

C8000-CBFFF Shadow
Enabled
Disabled

These six items are for shadowing ROM code on other expansion cards. Before you set these parameters, you need to know the specific addresses of that ROM code. If you do not know this information, enable all the ROM shadow settings.

Note: *The F000 and E000 segments are always shadowed because BIOS code occupies these areas.*

3.4 Chipset Features Setup

The "Chipset Features Setup" includes settings for the chipset dependent features. These features are related to system performance.

```
ROM PCI/ISA BIOS (XXXXXXXX)
CHIPSET FEATURES SETUP
AWARD SOFTWARE, INC.
```

Auto Configuration: Enabled DRAM Speed Selection :70 ns DRAM Read Burst (EDO/FP) :X333/x444 DRAM Write Burst (EDO/FP):X222/x333 DRAM Fast Leadoff :Disabled DRAM RAS# Precharge Time :3 MA Additional Wait State :Disabled RAS# to CAS# Delay :Disabled DRAM Refresh Queue :Enabled DRAM RAS Only Refresh :Disabled Fast DRAM Refresh :Disabled DRAM ECC/Parity Selection:Disabled ISA Bus Clock :PCICLK/4	8-bit I/O Recovery Time :4 16-bit I/O Recovery Time:1 Memory Hole At 15M-16M :Disabled PCI Passive Release :Disabled PCI Delayed Transaction :Disabled
PCI Burst Write Combine :Enabled PCI-to-DRAM Pipeline :Enabled CPU-to-PCI Write POST :Enabled CPU-to-PCI IDE Posting :Enabled Read-Around-Write :Enabled System BIOS Cacheable :Enabled Video BIOS Cacheable :Disabled	ESC: Quit ↑↓→← : Select Item F1 : Help PU/PD/+/- : Modify F5 : Old Values (Shift) F2 : Color F6 : Load Setup Defaults F7 : Load Turbo Defaults

Caution: *Make sure you fully understand the items contained in this menu before you try to change anything. You may change the parameter settings to improve system performance . However, it may cause system unstable if the setting are not correct for your system configuration.*

Chipset Features→ Auto Configuration

Auto Configuration
Enabled
Disabled

When **Enabled**, the DRAM and cache related timing are set to pre-defined value according to CPU type and clock. Select **Disable** if you want to specify your own DRAM timing.

Chipset Features→ DRAM Timing

DRAM Timing
60 ns
70 ns

There are two sets of DRAM timing parameters can be automatically set by BIOS, 60ns and 70ns.

***Warning**: The default memory timing setting is 60ns to get the optimal performance. Because the specification limitation of chipset, 70ns SIMM can only be used with CPU external clock 60MHz. To use 70ns SIMM with 66MHz CPU external clock may result in unstable system behavior.*

Chipset Features→ DRAM Read Burst (EDO/FP)

DRAM Read Burst (EDO/FP)
x444/x444
x333/x444
x222/x333

Read Burst means to read four continuous memory cycles on four predefined addresses from the DRAM. The default value is **x222/x333** for 60ns EDO or FPM (Fast Page Mode) DRAM. Which means the 2nd,3rd and 4th memory cycles are 2 CPU clocks for EDO and 3 clocks for FPM. The value of x is the timing of first memory cycle and depends on the "DRAM Fast Leadoff" setting.

Chipset Features→ DRAM Write Burst (EDO/FP)

DRAM Write Burst (EDO/FP)
x444/x444
x333/x444
x333/x333
x222/x333

Write Burst means to write four continuous memory cycles on four predefined addresses to the DRAM. The default value is **x222/x333** for 60ns EDO or FPM (Fast Page Mode) DRAM. Which means the 2nd,3rd and 4th memory cycles are 2 CPU clocks for EDO and 3 clocks for FPM. The value of x is the timing of first memory cycle and depends on the "DRAM Fast Leadoff" setting.

Chipset Features→ DRAM Fast Leadoff

DRAM Fast Leadoff
Enabled
Disabled

This item enable or disable the DRAM Fast Leadoff Timing. If enabled, the first cycle is 7 clocks. If disabled, the first cycle is 8 clocks. The default must be **Disabled**.

Chipset Features→ DRAM RAS# Precharge Time

DRAM RAS Prechatge Time
3
4

The RAS Precharge means the timing to inactive RAS and the timing for DRAM to do precharge before next RAS can be issued. RAS is the address latch control signal of DRAM row address. The default is **3 clocks** for 60ns EDO.

Chipset Features→ MA Additional Wait State

MA Additional Wait State
Disabled
Enabled

To enable or disable one additional MA (DRAM memory address) wait state. The default is **Disabled**. Enable it if you have heavy loading (many chip count) or lower speed DRAM.

Chipset Features→ RAS# to CAS# Delay

RAS# to CAS# Delay
Disabled
Enabled

To enable or disable additional RAS# to CAS# delay. The default is **Disabled** for 60ns DRAM. Enable it if you have heavy loading (many chip count) or 70ns DRAM.

Chipset Features→ DRAM Refresh Queue

DRAM Refresh Queue
Disabled
Enabled

This item enable or disable the 4-deep refresh queue of refresh request. If **Enabled**, all refresh requests are queued.

Chipset Features→ DRAM RAS Only Refresh

DRAM RAS Only Refresh
Disabled
Enabled

This item determines the DRAM refresh type. There are RAS-Only and CAS-before-RAS. The default is Disabled, that is, **CAS-before-RAS**refresh.

Chipset Features→ Fast DRAM Refresh

Fast DRAM Refresh
Disabled
Enabled

This item determines the DRAM refresh rate, it should be default **Disabled**, a faster DRAM refresh rate may slightly reduce performance. If you find your old DRAM is unstable, set this item to Enabled.

Chipset Features→ DRAM ECC/Parity Selection

DRAM ECC/Parity Selection
Parity
ECC
Disabled

There are three modes of memory error detection or correction, Parity mode, ECC mode and Disable. For detail, please refer to section "Configuring the System memory" in chapter 2.

Chipset Features→ ISA Bus Clock

ISA Bus Clock
PCICLK/4
PCICLK/3

This item selects the ISA bus clock. The PCI bus clock is the CPU bus (external) clock divided by 2, PCICLK= CPUCLK/2. For example, CPUCLK=66MHz, PCICLK= 66/2=33MHz, ISA bus CLK=33/4=8.25MHz.

Chipset Features→ PCI Burst Write Combine

PCI Burst Write Combine Enabled Disabled	If **Enabled**, the back-to-back sequential CPU to PCI rite cycles are combined together as a single burst write. Disable it, if you find any PCI card compatibility problem.

Chipset Features→ PCI-to-DRAM Pipeline

PCI-to-DRAM Pipeline Enabled Disabled	To enable or disable PCI to DRAM pipeline cycle. The write cycles will be queued in the FIFO or buffer, and CPU can be released to do next job.

Chipset Features→ CPU-to-PCI Write Post

CPU-to-PCI Write Post Enabled Disabled	To enable or disable CPU to PCI bus post write cycle. The write cycles will be queued in the FIFO or buffer, and CPU can be released to do next job.

Chipset Features→ CPU-to-PCI IDE Posting

CPU-to-PCI IDE Posting Enabled Disabled	To enable or disable CPU to PCI IDE post write cycle. The IDE write cycles will be queued in the FIFO or buffer, and CPU can be released to do next job. Disable it, if you find any IDE compatibility problem.

Chipset Features→ Read-Around-Write

Read-Around-Write Enabled Disabled	If Disabled, all posted write are retired before a CPU or PCI read access can be serviced. Disable it, if you find any PCI card compatibility problem.

Chipset Features→ System BIOS Cacheable

System BIOS Cacheable
Enabled
Disabled

Enabling this item allows you to cache the system BIOS to further enhance system performance.

Chipset Features→ Video BIOS Cacheable

Video BIOS Cacheable
Enabled
Disabled

Allows the video BIOS to be cached to allow faster video performance.

Chipset Features→ 8 Bit I/O Recovery Time

8 Bit I/O Recovery Time
1
2
3
4
5
6
7
8
NA

For some old I/O chips, after the execution of an I/O command, the device requires a certain amount of time (recovery time) before the execution of the next I/O command. Because of new generation CPU and mainboard chipset, the assertion of I/O command is faster, and sometimes shorter than specified I/O recovery time of old I/O devices. This item lets you specify the delay of 8-bit I/O command by count of ISA bus clock. If you find any unstable 8-bit I/O card, you may try to extend the I/O recovery time via this item. The BIOS default value is **4 ISA clock.** If set to NA, the chipset will insert 3.5 system clocks.

Chipset Features→ 16 Bit I/O Recovery Time

16 Bit I/O Recovery Time
1
2
3
4
NA

The same as 16-bit I/O recovery time. This item lets you specify the recovery time for the execution of 16-bit I/O commands by count of ISA bus clock. If you find any of the installed 16-bit I/O cards unstable, try extending the I/O recovery time via this item. The BIOS default value is **1 ISA clocks**. If set to NA, the chipset will automatically insert 3.5 system clocks.

Chipset Features→ Memory Hole At 15M-16M

Memory Hole At 15M-16M Enabled Disabled	This option lets you reserve system memory area for special ISA cards. The chipset accesses code/data of these areas from the ISA bus directly. Normally, these areas are reserved for memory mapped I/O card.

Chipset Features→ PCI Passive Release

PCI Passive Release Enabled Disabled	This item lets you control the Passive Release function of the PIIX3 chipset (Intel PCI to ISA bridge). This function is used to meet latency of ISA bus master. Try to enable or disable it, if you have ISA card compatibility problem.

Chipset Features→ PCI Delayed Transaction

PCI Delayed Transaction Enabled Disabled	This item lets you control the Delayed Transaction function of the PIIX3 chipset (Intel PCI to ISA bridge). This function is used to meet latency of PCI cycles to or from ISA bus. Try to enable or disable it, if you have ISA card compatibility problem.

3.5 Power Management Setup

The Power Management Setup screen enables you to control the mainboard green features. See the following screen.

```
ROM PCI/ISA BIOS (XXXXXXXX)
POWER MANAGEMENT SETUP
AWARD SOFTWARE, INC.
```

Power Management : Disabled PM Control by APM : Yes Video Off Method : V/H SYNC+Blank Video Off After : Suspend Doze Mode : Disabled Standby Mode : Disabled Suspend Mode : Disabled HDD Power Down : Disabled ** Wake Up Events of Doze/Standby ** IRQ3 (COM2) : Enabled IRQ4 (COM1) : Enabled IRQ8 (RTC Alarm) : Disabled IRQ12 (PS/2 Mouse) : Enabled	** Power Down & Resume from Suspend ** IRQ3 (COM2) : Enabled IRQ4 (COM1) : Enabled IRQ5 (LPT2) : Enabled IRQ6 (Floppy Disk): Enabled IRQ7 (LPT1) : Enabled IRQ8 (RTC Alarm) : Disabled IRQ9 (IRQ2 Redir) : Enabled IRQ10 (Reserved) : Enabled IRQ11 (Reserved) : Enabled IRQ12 (PS/2 Mouse) : Enabled IRQ13 (Coprocessor): Enabled IRQ14 (IDE1) : Enabled IRQ15 (IDE2) : Enabled ESC: Quit ↑↓→← : Select Item F1 : Help PU/PD/+/- : Modify F5 : Old Values (Shift) F2 : Color F6 : Load Setup Defaults F7 : Load Turbo Defaults

Power Management→ Power Management

Power Management
Max Saving
Mix Saving
User Defined
Disabled

This function allows you to set the default parameters of power-saving modes. Set to **Disable** to turn off power management function. Set to User Defined to choose your own parameters.

Mode	Doze	Standby	Suspend	HDD Power Down
Min Saving	1 hour	1 hour	1 hour	15 min
Max Saving	1 min	1 min	1 min	1 min

Power Management→ PM Controlled by APM

PM Controlled by APM
Yes
No

If "Max Saving" is selected, you can turn on this item, transfer power management control to APM (Advanced Power Management) and enhance power saving function. For example, stop CPU internal clock.

Power Management→ Video Off Method

Video Off Method
Blank Screen
V/H SYNC+Blank
DPMS

This determines the way that monitor is off. Blank Screen writes blanks to video buffer. V/H SYNC+Blank allows BIOS to control VSYNC and HSYNC signals. This function applies only for DPMS (Display Power Management Standard) monitor. The DPMS mode uses DPMS function provided by VGA card.

Power Management→ Video Off After

Video Off After
N/A
Doze
Standby
Suspend

To turn off video monitor at which power down mode.

Power Management→ Doze Mode

Doze Mode
Disabled
1 Min
2 Min
4 Min
8 Min
12 Min
20 Min
30 Min
40 Min
1 Hour

This item lets you set the period of time after which the system enters into Doze mode. In this mode, the CPU clock slows down. The ratio is specified in the "Throttle Duty Cycle". Any activity detected returns the system to full power. The system activity (or event) is detected by monitoring the IRQ signals.

Power Management→ Standby Mode

Standby Mode
Disabled
1 Min
2 Min
4 Min
8 Min
12 Min
20 Min
30 Min
40 Min
1 Hour

This item lets you set the period of time after which the system enters into Standby mode. In this mode, CPU clock slows down, hard disk will be shut off and the monitor power-saving feature activates. Any activity detected returns the system to full power. The system activity (or event) is detected by monitoring the IRQ signals.

Power Management→ Suspend Mode

Suspend Mode
Disabled
1 Min
2 Min
4 Min
8 Min
12 Min
20 Min
30 Min
40 Min
1 Hour

This item lets you set the period of time after which the system enters into Suspend mode. The Suspend mode can be Power On Suspend or Suspend to Hard Drive, selected by "Suspend Mode Option".

Power Management→ HDD Power Down

HDD Power Down
Disabled
1 Min
.....
15 Min

This option lets you specify the IDE HDD idle time before the device enters the power down state. This item is independent from the power states previously described in this section (Standby and Suspend).

** Wake Up Events of Doze and Standby **
Power Management→ IRQ3 (COM2) WakeUp
Power Management→ IRQ4 (COM1) WakeUp
Power Management→ IRQ8 (RTC Alarm) WakeUp
Power Management→ IRQ12 (PS/2 Mouse) WakeUp

IRQ3 (COM2) WakeUp
Enabled
Disabled

To enable or disable the detection of COM port, RTC and PS/2 mouse activities for system to wake up during Doze and Standby. Note that OS2 has periodically IRQ8 (RTC) interruptions, If IRQ8 is not set to **Disabled**, OS/2 may fail to go into Doze/Standby/Suspend mode

**** Power Down and Resume from Suspend ****
Power Management→ IRQ3 (COM2)
Power Management→ IRQ4 (COM1)
Power Management→ IRQ5 (LPT2)
Power Management→ IRQ6 (Floppy Disk)
Power Management→ IRQ8 (RTC Alarm)
Power Management→ IRQ9 (IRQ2 Redir)
Power Management→ IRQ10 (Reserved)
Power Management→ IRQ11 (Reserved)
Power Management→ IRQ12 (PS/2 Mouse)
Power Management→ IRQ13 (Coprocessor)
Power Management→ IRQ14 (IDE1)
Power Management→ IRQ15 (IDE2)

IRQ3 (COM2)
Enabled
Disabled

To enable or disable the detection of IRQ event for power down state transition and for resume from Suspend mode. Note that OS2 has periodically IRQ8 (RTC) interruptions, If IRQ8 is not set to **Disabled**, OS/2 may fail to go into Doze/Standby/Suspend mode.

3.6 PNP/PCI Configuration Setup

The PNP/PCI Configuration Setup allows you to configure the ISA and PCI devices installed in your system. The following screen appears if you select the option "PNP/PCI Configuration Setup" from the main menu.

```
ROM PCI/ISA BIOS (XXXXXXXX)
PNP/PCI CONFIGURATION SETUP
AWARD SOFTWARE, INC.
```

PnP OS Installed : No	PCI IDE IRQ Map To : PCI-Auto
Resources Controlled By : Manual	Primary IDE INT# : A
Reset Configuration Data : Disabled	Secondary IDE INT# : B
	Used MEM base addr : N/A
IRQ 3 assigned to : PCI/ISA PnP	Used MEM Length : 8K
IRQ 4 assigned to : PCI/ISA PnP	
IRQ 5 assigned to : PCI/ISA PnP	
IRQ 7 assigned to : PCI/ISA PnP	
IRQ 9 assigned to : PCI/ISA PnP	
IRQ 10 assigned to : PCI/ISA PnP	
IRQ 11 assigned to : PCI/ISA PnP	
IRQ 12 assigned to : PCI/ISA PnP	
IRQ 14 assigned to : PCI/ISA PnP	
IRQ 15 assigned to : PCI/ISA PnP	
DMA 0 assigned to : PCI/ISA PnP	ESC: Quit ↑↓→← : Select Item
DMA 1 assigned to : PCI/ISA PnP	F1 : Help PU/PD/+/- : Modify
DMA 3 assigned to : PCI/ISA PnP	F5 : Old Values (Shift) F2 : Color
DMA 5 assigned to : PCI/ISA PnP	F6 : Load Setup Defaults
DMA 6 assigned to : PCI/ISA PnP	F7 : Load Turbo Defaults
DMA 7 assigned to : PCI/ISA PnP	

PNP/PCI Configuration→ PnP OS Installed

PnP OS Installed
Yes
No

Normally, the PnP resources are allocated by BIOS during POST (Power-On Self Test). If you are using a PnP operating system (such as Windows 95), set this item to Yes to inform BIOS to configure only the resources needed for booting (VGA/IDE or SCSI). The rest of system resources will be allocated by PnP operating system.

PNP/PCI Configuration→ Resources Controlled By

Resources Controlled by
Auto
Manual

Setting this option to Manual allows you to individually assign the IRQs and DMAs to the ISA and PCI devices. Set this to **Auto** to enable the auto-configuration function.

PNP/PCI Configuration→ Reset Configuration Data

Reset Configuration Data
Enabled
Disabled

In case conflict occurs after you assign the IRQs or after you configure your system, you can enable this function, allow your system to automatically reset your configuration and reassign the IRQs.

PNP/PCI Configuration→ IRQ3 (COM2)
PNP/PCI Configuration→ IRQ4 (COM1)
PNP/PCI Configuration→ IRQ5 (Network/Sound or Others)
PNP/PCI Configuration→ IRQ7 (Printer or Others)
PNP/PCI Configuration→ IRQ9 (Video or Others)
PNP/PCI Configuration→ IRQ10 (SCSI or Others)
PNP/PCI Configuration→ IRQ11 (SCSI or Others)
PNP/PCI Configuration→ IRQ12 (PS/2 Mouse)
PNP/PCI Configuration→ IRQ14 (IDE1)
PNP/PCI Configuration→ IRQ15 (IDE2)

IRQ 3
Legacy ISA
PCI/ISA PnP

If your ISA card is not PnP compatible and requires a special IRQ to support its function, set the selected IRQ to **Legacy ISA**. This setting informs the PnP BIOS to reserve the selected IRQ for the installed legacy ISA card. The default is **PCI/ISA PnP**. Take note that PCI cards are always PnP compatible (except old PCI IDE card).

PNP/PCI Configuration→ DMA 0
PNP/PCI Configuration→ DMA 1
PNP/PCI Configuration→ DMA 3
PNP/PCI Configuration→ DMA 5
PNP/PCI Configuration→ DMA 6
PNP/PCI Configuration→ DMA 7

DMA 0
Legacy ISA
PCI/ISA PnP

If your ISA card is not PnP compatible and requires a special DMA channel to support its function, set the selected DMA channel to **Legacy ISA**. This setting informs the PnP BIOS to reserve the selected DMA channel for the installed legacy ISA card. The default is **PCI/ISA PnP**. Take note that PCI card does not require DMA channel.

PNP/PCI Configuration→ PCI IDE IRQ Map To

PCI IDE IRQ Map To
ISA
PCI-Slot1
PCI-Slot2
PCI-Slot3
PCI-Slot4
PCI-Auto

Some old PCI IDE add-on cards are not fully PnP compatible. These cards require you to specify the slot in use to enable BIOS to properly configure the PnP resources. This function allows you to select the PCI slot for any PCI IDE add-on card present in your system. Set this item to **Auto** to allow BIOS to automatically configure the installed PCI IDE card(s).

PNP/PCI Configuration→ Primary IDE INT#
PNP/PCI Configuration→ Secondary IDE INT#

Primary IDE INT#
A
B
C
D

These two items, in conjunction with item "PCI IDE IRQ Map To", specify the IRQ routing of the primary or secondary channel of the PCI IDE add-on card (not the onboard IDE). Each PCI slot has four PCI interrupts aligned as listed in the table below. You must specify the slot in the "PCI IDE IRQ Map To", and set the PCI interrupt (INTx) here according to the interrupt connection on the card.

PCI Slot	Location 1	Location 2	Location 3	Location 4

	(pin A6)	(pin B7)	(pin A7)	(pin B8)
Slot 1	INTA	INTB	INTC	INTD
Slot 2	INTB	INTC	INTD	INTA
Slot 3	INTC	INTD	INTA	INTB
Slot 4	INTD	INTA	INTB	INTC
Slot 5 (if any)	INTD	INTA	INTB	INTC

PNP/PCI Configuration→ Used MEM Base Addr

Used MEM base addr
N/A
C800
CC00
D000
D400
D800
DC00

This item, in conjunction with the "Used MEM Length", lets you set a memory space for non-PnP compatible ISA card. This item specifies the memory base (start address) of the reserved memory space. The memory size is specified in the "Used MEM Length".

PNP/PCI Configuration→ Used MEM Length

Used MEM Length
8K
16K
32K
64K

If your ISA card is not PnP compatible and requires special memory space to support its function, specify the memory size in this parameter to inform the PnP BIOS to reserve the specified memory space for installed legacy ISA card.

3.7 Load Setup Defaults

The "Load Setup Defaults" option loads optimized settings for optimum system performance. Optimal settings are relatively safer than the Turbo settings. We recommend you to use the Optimal settings if your system has large memory size and fully loaded with add-on card (for example, a file server using double-sided 8MB SIMM x4 and SCSI plus Network card occupying the PCI and ISA slots).

Optimal is not the slowest setting for this mainboard. If you need to verify a unstable problem, you may manually set the parameter in the "BIOS Features Setup" and "Chipset Features Setup" to get slowest and safer setting.

3.8 Load Turbo Defaults

The "Load Turbo Defaults" option gives better performance than Optimal values. However, Turbo values may not be the best setting of this mainboard but these values are qualified by the AOpen RD and QA department as the reliable settings especially if you have limited loading of add-on card and memory size (for example, a system that contains only a VGA/Sound card and two SIMMs).

To attain the best system performance, you may manually set the parameters in the "Chipset Features Setup" to get proprietary setting. Make sure that you know and understand the functions of every item in Chipset Setup menu. The performance difference of Turbo from Optimal is normally around 3% to 10%, depending on the chipset and the application.

3.9 Integrated Peripherals

The following screen appears if you select the option "Integrated Peripherals" from the main menu. This option allows you to configure the I/O features.

```
ROM PCI/ISA BIOS (XXXXXXXX)
INTEGRATED PERIPHERALS
AWARD SOFTWARE, INC.
```

IDE HDD Block Mode:	Enabled	ECP Mode Use DMA	3
IDE Primary Master PIO	Auto		
IDE Primary Slave PIO	Auto		
IDE Secondary Master PIO	Auto		
IDE Secondary Slave PIO	Auto		
On-Chip Primary PCI-IDE	Enabled		
On-Chip Secondary PCI-IDE	Enabled		
USB Host Controller	Disabled		
USB Legacy Support	Disabled		
Onboard FDC Controller	Enabled		
Onboard Serial Port 1	AUTO	ESC: Quit	↑↓→← : Select Item
Onboard Serial Port 2	AUTO	F1 : Help	PU/PD/+/- : Modify
Onboard IR Controller	Enabled	F5 : Old Values	(Shift) F2 : Color
IR Mode	HPSIR	F6 : Load Setup Defaults	
IR Address Selection	2E8H	F7 : Load Turbo Defaults	
IR IRQ Selection	IRQ10		
FIR Mode Use DMA	Disabled		
Modem Wake Up	Disabled		
Onboard Parallel Port	378/IRQ7		
Parallel Port Mode	SPP		

Integrated Peripherals→ IDE HDD Block Mode

IDE HDD Block Mode
Enabled
Disabled

This feature enhances disk performance by allowing multisector data transfers and eliminates the interrupt handling time for each sector. Most IDE drives, except with old designs, can support this feature.

Integrated Peripherals→ IDE Primary Master PIO
Integrated Peripherals→ IDE Primary Slave PIO
Integrated Peripherals→ IDE Secondary Master PIO
Integrated Peripherals→ IDE Secondary Slave PIO

IDE Primary Master PIO
Auto
Mode 1
Mode 2
Mode 3
Mode 4

Setting this item to **Auto** activates the HDD speed auto-detect function. The PIO mode specifies the data transfer rate of HDD. For example: mode 0 data transfer rate is 3.3MB/s, mode 1 is 5.2MB/s, mode 2 is 8.3MB/s, mode 3 is 11.1MB/s and mode 4 is 16.6MB/s. If your hard disk performance becomes unstable, you may manually try the slower mode.

Caution: *It is recommended that you connect the first IDE device of each channel to the endmost connector of the IDE cable. Refer to section "Connectors" for details on how to connect IDE device(s).*

Integrated Peripherals→ On-Chip Primary PCI IDE
Integrated Peripherals→ On-Chip Secondary PCI IDE

On-Chip Primary PCI IDE
Enabled
Disabled

This parameter lets you enable or disable the IDE device connected to the primary IDE connector.

Integrated Peripherals→ USB Host Controller

USB Host Controller
Enabled
Disabled

This item lets you enable or disable the USB controller within the chipset.

Integrated Peripherals→ USB Legacy Support

USB Legacy Support
Enabled
Disabled

This item lets you enable or disable the USB keyboard driver within the onboard BIOS. The keyboard driver simulates legacy keyboard command and let you use USB keyboard during POST or after boot if you don't have USB driver in the operating system.

***Caution**: You can not use both USB driver and USB legacy keyboard at the same time. Disable "USB Legacy Support" if you have USB driver in the operating system.*

Integrated Peripherals→ Onboard FDC Controller

Onboard FDC Controller
Enabled
Disabled

Setting this parameter to **Enabled** allows you to connect your floppy disk drives to the onboard floppy disk connector instead of a separate controller card. Change the setting to Disabled if you want to use a separate controller card.

Integrated Peripherals→ Onboard Serial Port 1
Integrated Peripherals→ Onboard Serial Port 2

Onboard Serial Port 1
Auto
3F8/IRQ4
2F8/IRQ3
3E8/IRQ4
2E8/IRQ3
Disabled

This item allow you to assign address and interrupt for the board serial port. Default is **Auto**.

***Note:** If you are using an network card, make sure that the interrupt does not conflict.*

Integrated Peripherals→ Onboard IR Controller

Onboard IR Controller
Enabled
Disabled

To enable or disable onboard wireless Infrared controller.

Integrated Peripherals→ IR Mode

IR Mode
ASKIR
IrDA

This item selects the mode of onboard wireless Infrared controller. The IrDA standard includes both HPSIR and FIR, the driver in the Win95 will automatically change to different mode according to different chip.

- ASKIR - Select this setting if you installed an Infrared module via IrDA connector (refer to section 2.3 "Connectors"). This ASKIR setting allows infrared serial communication at a maximum baud rate of 19.2K baud.
- HPSIR - Select this setting if you installed an Infrared module in your system via IrDA connector (refer to section 2.3 "Connectors"). The HPSIR setting allows infrared serial communication at a maximum baud rate of 115K baud.
- FIR - Select this setting if you installed an Infrared module via IrDA connector (refer to section 2.3 "Connectors"). This FIR (Fast IR) setting allows infrared serial communication at a maximum baud rate of 4M baud.

Integrated Peripherals→ IR Address Selection

IR Address Selection
2E0H
2E8H
2F8H
3E0H
3E8H
3F8H

This item selects the address of IR controller.

Integrated Peripherals→ IR IRQ Selection

IR IRQ Selection
3
4
10
11

This item selects the IRQ of IR port.

Note: *If you are using a network card, make sure that the interrupt does not conflict.*

Integrated Peripherals→ FIR Mode Use DMA

FIR Mode Use DMA
Disabled
0
1
3

This item selects the DMA channel of Fast IR port.

Note: *If you are using a sound card, make sure that the interrupt does not conflict.*

Integrated Peripherals→ Modem Wake Up

Modem Wake Up
Enabled
Disabled

To enable or disable Modem Wake Up function.

Note: *This function is only for internal test only.*

Integrated Peripherals→ Onboard Parallel Port

Onboard Parallel Port
3BC/IRQ7
378/IRQ7
278/IRQ7
Disabled

This item controls the onboard parallel port address and interrupt.

Note: *If you are using an I/O card with a parallel port, make sure that the addresses and IRQ do not conflict.*

Integrated Peripherals→ Parallel Port Mode

Parallel Port Mode
SPP
EPP
ECP
ECP + EPP

This item lets you set the parallel port mode. The mode options are **SPP** (Standard Parallel Port), EPP (Enhanced Parallel Port) and ECP (Extended Parallel Port). SPP is the IBM AT and PS/2 compatible mode. EPP enhances the parallel port throughput by directly writing/reading data to/from parallel port without latch. ECP supports DMA and RLE (Run Length Encoded) compression and decompression.

Integrated Peripherals→ ECP Mode Use DMA

ECP Mode Use DMA
3
1

This item lets you set the DMA channel of ECP mode.

3.10 Password Setting

Password prevents unauthorized use of your computer. If you set a password, the system prompts for the correct password before boot or access to Setup.

To set a password:

1. At the prompt, type your password. Your password can be up to 8 alphanumeric characters. When you type the characters, they appear as asterisks on the password screen box.

2. After typing the password, press.

3. At the next prompt, re-type your password and press again to confirm the new password. After the password entry, the screen automatically reverts to the main screen.

To disable the password, press when prompted to enter the password. The screen displays a message confirming that the password has been disabled.

3.11 IDE HDD Auto Detection

If your system has an IDE hard drive, you can use this function to detect its parameters and enter them into the "Standard CMOS Setup" automatically.

This routine only detects one set of parameters for your IDE hard drive. Some IDE drives can use more than one set of parameters. If your hard disk is formatted using different parameters than those detected, you have to enter the parameters manually. If the parameters listed do not match the ones used to format the disk, the information on that disk will not be accessible. If the auto-detected parameters displayed do not match those that used for your drive, ignore them. Type N to reject the values and enter the correct ones manually from the Standard CMOS Setup screen.

3.12 Save & Exit Setup

This function automatically saves all CMOS values before leaving Setup.

3.13 Exit without Saving

Use this function to exit Setup without saving the CMOS value changes. Do not use this option if you want to save the new configuration.

3.14 NCR SCSI BIOS and Drivers

The NCR 53C810 SCSI BIOS resides in the same flash memory chip as the system BIOS. The onboard NCR SCSI BIOS is used to support NCR 53C810 SCSI control card without BIOS code.

The NCR SCSI BIOS directly supports DOS, Windows 3.1 and OS/2. For better system performance, you may use the drivers that come with the NCR SCSI card or with your operating system. For details, refer to the installation manual of your NCR 53C810 SCSI card.

3.15 AWARD BIOS Flash Utility

The AWARD Flash utility allows you to upgrade the system BIOS. To get the AWARD Flash utility and the upgrade BIOS file, contact your local distributor or visit our homepage at **http://www.aopen.com.tw** . Please make sure that you have the correct BIOS ready, the BIOS filename is normally like AX6FR100.BIN, which means model AX6F BIOS revision 1.00.

There are three useful programs, Onboard IO chip check utility, Checksum utility CHECKSUM.EXE and AWARD Flash utility AWDFLASH.EXE. Follow the procedures below to upgrade your BIOS.

[CHECKSUM.EXE]

This utility will help you to determine if the BIOS has been downloaded correctly or not.

1. Execute
   C:> CHECKSUM Biosfile.bin
   Biosfile.bin is the filename of the BIOS code.
2. The utility will show "Checksum is ssss".
3. Compare the "ssss" with original checksum posted on Web or BBS. If they are different, please do not proceed any further and try to download the BIOS again.

[IO.EXE]

This utility will help you to determine the model of onboard IO chip, as well as BIOS version. Make sure the BIOS you download supports the onboard IO chip and the BIOS version is later than the current onboard BIOS.

1. Execute
   C:> IO

[AWDFLASH.EXE]

AWARD BIOS

This utility will try to reprogram your system BIOS by using flash memory technology. It will permanently replace your original BIOS content after flashing.

1. Bootup the system from DOS prompt without loading any memory manager (HIMEM, EMM386, QEMM386, ...).
2. Execute

   C:> AWDFLASH Biosfile.bin

   Biosfile.bin is the filename of the BIOS code.
3. After loading the new BIOS code, the utility will prompt you to save original BIOS code into your HDD or floppy. Please press "Y" to store it as "BIOS.OLD".
4. After the old BIOS has been successfully saved, press "Y" to replace BIOS.
5. DO NOT turn off the power during "FLASHING".
6. Reboot the system by turn off the power after "FLASHING".
7. Press "DEL" key to enter BIOS setup during POST.
8. Reload the "BIOS SETUP DEFAULT" and reconfigure other items as previous set.
9. Save & Exit. Done!

Warning: *DO NOT turn off the power during "FLASHING". If the BIOS programming is not successfully finished, the system will not be boot again, and you may need to physically replace the BIOS chip.*

Tip: *You may load back original BIOS "BIOS.OLD" by the same procedure.*

Appendix A

Jumper Table Summary

Selecting the CPU Frequency

JP1	JP2	JP3	CPU Frequency Ratio
2-3	1-2	2-3	1.5x
1-2	1-2	1-2	2x
1-2	1-2	2-3	2.5x
1-2	2-3	1-2	3x
1-2	2-3	2-3	3.5x
2-3	1-2	1-2	4x
2-3	1-2	2-3	4.5x
2-3	2-3	1-2	5x
2-3	2-3	2-3	5.5x
1-2	1-2	1-2	6x
1-2	1-2	2-3	6.5x
1-2	2-3	1-2	7x
1-2	2-3	2-3	7.5x
2-3	1-2	1-2	8x

JP6	JP5	CPU External Clock
1-2	1-2	66MHz (default)
2-3	2-3	60MHz

INTEL Pentium II	CPU Core Frequency	Ratio	External Bus Clock	JP3 & JP2 & JP1	JP6 & JP5
Klamath 200	200MHz =	3x	66MHz	1-2 & 2-3 & 1-2	1-2 & 1-2
Klamath 233	233MHz =	3.5x	66MHz	2-3 & 2-3 & 1-2	1-2 & 1-2
Klamath 266	266MHz =	4x	66MHz	1-2 & 1-2 & 2-3	1-2 & 1-2

Clear CMOS

JP14	Clear CMOS
1-2	Normal operation (default)
2-3	Clear CMOS

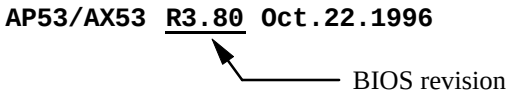
Appendix B

Frequently Asked Question

Note: *FAQ may be updated without notice. If you cannot find the information that you need in this appendix, visit our WWW home page, (address:* ***http://www.aopen.com.tw****) and check the FAQ area and other new information.*

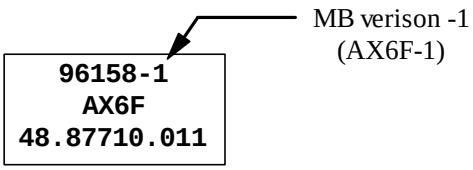
Q: How can I identify the mainboard BIOS version?

A: The AOpen mainboard BIOS version appears on the upper-left corner of the POST (Power-On Self Test) screen. Normally, it starts with R and is found in between the model name and the date. For example:



Q: How can I identify version of the mainboard?

A: The AOpen mainboard version appears as ppppp-x on the PCB, near the PCI slot and is enclosed in a white bordered box. The ppppp is the project code used by AOpen internally and -x is the version code. For example, for AX6F with 96158 project code and -1 version code, the mainboard version appears on the PCB as follows:



Frequently Asked Questions

Q: What is MMX?

A: MMX is the new single-line multiple-instruction technology of the new Intel Pentium PP/MT (P55C) and Pentium II (Klamath) CPU. The AMD K6 and Cyrix M2 will support MMX too. The MMX instructions are specifically useful for multimedia applications (such as 3D video, 3D sound, video conference). The performance can be improved if applications use these instructions. All AOpen MBs have at least dual power onboard to support MMX. It is not necessary to have special chipset for MMX CPU.

Q: What is the performance improvement of Pentium II (Klamath)?

A: Following is the compare table of the new generation CPU.

DRAM : 64MB EDO

HDD : Quantum Fireball 1280AT

VGA : Matrox Millennium VGA, 4MB, 1024x768 24bit, 85Hz.

OS : Windows 95 4.00.950

CPU	MB	Chipset	Winstone97 Business	Winstone97 High-End
PP/MT-200	AP5T/AX5T	Intel 430TX	48.3	21.9
PP/MT-233	AP5T/AX5T	Intel 430TX	50.5	23.6
Pentium II 200	AX6F	Intel 440FX	45.3	24.1
Pentium II 233	AX6F	Intel 440FX	48.4	26.5
Pentium II 266	AX6F	Intel 440FX	50.8	28.2

You can see that Klamath-233 is no better than PP/MT-233 on Business Winstone97, but it has large improvement on High-End Winstone97. It is probably because Klamath has very good floating point performance and is suitable for graphic operation.

Q: What is USB (Universal Serial Bus)?

A: USB is a new 4-pin serial peripheral bus that is capable of cascading low/medium speed peripherals (less than 10Mbit/s) such as keyboard, mouse, joystick, scanner, printer and modem/ISDN. With USB, the traditional complex cables from back panel of your PC can be eliminated.

You need the USB driver to support USB device(s). AOpen MBs are all USB ready, you may get latest BIOS from AOpen web site (http://www.aopen.com.tw). Our latest BIOS includes the keyboard driver (called Legacy mode), that simulates USB keyboard to act as AT or PS/2 keyboard and makes it possible to use USB keyboard if you don't have driver

in your OS. For other USB devices, you may get the drivers from your device vendor or from OS (such as Win95). Be sure to turn off "USB Legacy Support" in BIOS "Chipset Setup" if you have another driver in your OS.

Q: What is P1394?

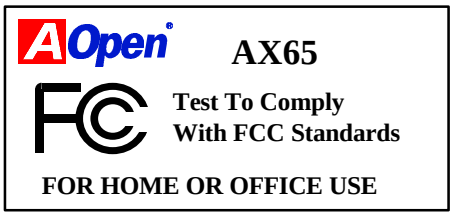
A: P1394 (IEEE 1394) is another standard of high-speed serial peripheral bus. Unlike low or medium speed USB, P1394 supports 50 to 1000Mbit/s and can be used for video camera, disk and LAN. Since P1394 is still under development, , there is no P1394 device currently available in the PC market. Also, there is no chipset that can support P1394. Probably in the near future, a card will be developed to support P1394 device.

Q: What is SMBus (System Management Bus, also called I2C bus)?

A: SMBus is a two-wire bus developed for component communication (especially for semiconductor IC). It is most useful for notebook to detect component status and replace hardware configuration pin (pull-high or pull-low). For example, disabling clock of DIMM that does not exist, or detecting battery low condition. The data transfer rate of SMBus is only 100Kbit/s, it allows one host to communicate with CPU and many masters and slaves to send/receive message. The SMBus may be used for jumpless mainboard, the components which support SMbus are not ready yet, we will keep eyes on it.

Q: What is FCC DoC (Declaration of Conformity)?

A: The DoC is new certification standard of FCC regulations. This newstandard allows DIY component (such as mainboard) to apply DoC label separately without a shielding of housing. The rule to test mainboard for DoC is to remove housing and test it with regulation 47 CFR 15.31. The DoC test of mainboard is more difficult than traditional FCC test. If the mainboard passes DoC test, that means it has very low EMI radiation and you can use any kind of housing (even paper housing). Following is an example of DoC label.



Q: What is EDO (Extended Data Output) memory?

A: The EDO DRAM technology of EDO is actually very similar to FPM (Fast Page Mode). Unlike traditional FPM that tri-states the memory output data to

start the pre-charge activity, EDO DRAM holds the memory data valid until the next memory access cycle, that is similar to pipeline effect and reduces one clock state.

Q: What is ECC (Error Checking and Correction)? Do I need special ECC SIMM?

A: The ECC mode needs 8 ECC bits for 64-bit data. Since 36-bit SIMM has 4 bits more for parity, ECC mode can be supported by using only two parity SIMMs. There is no need to have special ECC SIMM. Each time memory is accessed, ECC bits are updated and checked by a special algorithm. The ECC algorithm has the ability to detect double-bit error and automatically correct single-bit error while parity mode can only detect single-bit error. Intel 430HX (P5) and 440FX /440LX (P6) support ECC mode..

Q: What is Bus Master IDE (DMA mode)?

A: The traditional PIO (Programmable I/O) IDE requires the CPU to involve in all the activities of the IDE access including waiting for the mechanical events. To reduce the workload of the CPU, the bus master IDE device transfers data from/to memory without interrupting CPU, and releases CPU to operate concurrently while data is transferring between memory and IDE device. You need the bus master IDE driver and the bus master IDE HDD to support bus master IDE mode. Note that it is different with master/slave mode of the IDE device connection. For more details, refer to section 2.3 "Connectors".

Q: What is the Ultra DMA/33?

A: This is the new specification to improve IDE HDD data transfer rate. Unlike traditional PIO mode, which only uses the rising edge of IDE command signal to transfer data, the DMA/33 uses both rising edge and falling edge. Hence, the data transfer rate is double of the PIO mode 4 or DMA mode 2. (16.6MB/s x2 = 33MB/s).

The following table lists the transfer rate of IDE PIO and DMA modes. The IDE bus is 16-bit, which means every transfer is two bytes.

Mode	Clock per 33MHz PCI	Clock count	Cycle time	Data Transfer rate
PIO mode 0	30ns	20	600ns	(1/600ns) x 2byte = 3.3MB/s
PIO mode 1	30ns	13	383ns	(1/383ns) x 2byte = 5.2MB/s
PIO mode 2	30ns	8	240ns	(1/240ns) x 2byte = 8.3MB/s

PIO mode 3	30ns	6	180ns	(1/180ns) x 2byte = 11.1MB/s
PIO mode 4	30ns	4	120ns	(1/120ns) x 2byte = 16.6MB/s
DMA mode 0	30ns	16	480ns	(1/480ns) x 2byte = 4.16MB/s
DMA mode 1	30ns	5	150ns	(1/150ns) x 2byte = 13.3MB/s
DMA mode 2	30ns	4	120ns	(1/120ns) x 2byte = 16.6MB/s
DMA/33	30ns	4	120ns	(1/120ns) x 2byte x2 = 33MB/s

Q: What is Flash ROM BIOS? What is the BIOS size?

A: All the mainboards need BIOS (Basic Input/Output System). BIOS is a set of basic I/O control routine grouped together, it provides low level hardware support to the operating system. Traditional mainboard stores BIOS code in EPROM (Erasable Programmable ROM), if BIOS has to be upgraded, you need to remove EPROM from mainboard, clear by ultra-violet (UV) light, re-program, and then insert back.. AOpen mainboards use much easier Flash ROM, only Flash ROM programming utility is necessary, no need to open housing and change the BIOS ROM. You may connect to http:// www.aopen.com.tw to download BIOS for upgrade.

Q: What is PnP (Plug and Play)?

A: In the past, the IRQ/DMA and memory or I/O space of add-on cards are normally set manually, i.e., by jumper or by proprietary utility. The user has to check the user's guide for the correct setting. Sometimes, resource conflict occurs and this leads to unstable system. The PnP specification suggests a standard register interface for both BIOS and OS (such as Win95). These registers are used by BIOS and OS to configure system resource and prevent any conflicts. The IRQ/DMA/Memory will be automatically allocated by PnP BIOS or OS.

Currently, almost all the PCI cards and most ISA cards are PnP compliant. If you are still using a Legacy ISA card that cannot support PnP, set the corresponding resource (IRQ/DMA/memory) to ISA in the BIOS "PCI/PnP Setup".

Q: Why will the system BIOS assign an IRQ to the PCI VGA card?

A: Based on the PCI/PnP specification, system BIOS will automatically assign an IRQ to each PCI add-on card detected regardless of VGA requirement. If you do not want BIOS to assign an IRQ to the installed PCI VGA card, enter the BIOS PCI/PnP Setup and set the specific PCI slot IRQ Priority to "None".

Q: What is ACPI (Advanced Configuration & Power Interface) and OnNow?

A: The ACPI is new power management specification of 1997 (PC97). It intends to save more power by taking full control of power management to operating

system and not through BIOS. Because of this, the chipset or super I/O chip needs to provide standard register interface to OS (such as Win97) and provides the ability for OS to shutdown and resume power of different part of chip. The idea is a bit similar to the PnP register interface.

ACPI defines momentary soft power switch to control the power state transition. Most likely, it uses the ATX form factor with momentary soft power switch. The most attractive part of ACPI for desktop user is probably the "OnNow" feature, an idea from notebook. This feature allows you to immediately resume to your original work without the long time waiting from bootup, entering Win95 and running Winword. The AX5T with Intel TX chipset can support ACPI.

Q: What is ATX Soft Power On/Off and Momentary Switch?

A: The Soft Power On of the ATX specification means to provide a standby current for special circuit to wait for wakeup event when main power is off. For example, Infrared wakeup, modem wakeup, or voice wakeup. Currently, the most simple usage is to provide standby current for power switch circuit so that power switch can turn on/off the main power through soft power control pin. The ATX power specification does not mention anything about the power switch type. You can use toggle or momentary switch, note that ACPI specification requires momentary switch for power state control. All the AOpen ATX MBs support momentary switch and AX5T/AX58/AX6L support modem wakeup (Modem Ring-On).

Soft Power Off means to turn off system through software, Windows 95 Shutdown function can be used to verify if your mainboard supports soft power off. AOpen AX5T/AX58/AX6F/AX6L support soft power off.

Q: What is the AGP (Accelerated Graphic Port)?

A: AGP is a PCI-like bus interface targeted for high-performance 3D graphic. AGP supports only memory read/write operation and single-master single-slave one-to-one only. The AGP uses both rising and falling edge of the 66MHz clock and produces 66MHz x 4byte x 2 = 528MB/s data transfer rate. The AOpen AX6L MB are designed to support AGP via the new Intel Klamath LX chipset.

Q: Does Pentium or Pentium Pro MB support Deturbo mode?

A: The Deturbo mode was originally designed to slow down CPU speed for old applications (especially old games). It uses programming loop to wait or delay special event. This programming method is considered very bad since the delay of loop highly depends on the CPU speed and the application fails at high-speed CPU. Almost all new applications (including games) use RTC or interrupt to wait event. There is no need for Deturbo mode now. The Turbo switch is now used as Suspend switch. However, some MBs still support Turbo/Deturbo function via keyboard. You can set the system to

Deturbo by pressing <Ctrl> <Alt> <->. To back to Turbo mode, press <Ctrl> <Alt> <+>. Note that the Deturbo mode has been removed in new MBs since these require more code space in Flash ROM.

Q: Power Management Icon does not appear in the Windows 95 Control Panel even though the APM under BIOS Setup is enabled.

A: This problem occurs if you did not enable the APM function before you install Windows 95. If you have already installed Windows 95, re-install it after the BIOS APM function is enabled.

Q: Why does the system fail to go into suspend mode under Win95?

A: This problem may be caused by your CDROM settings. The CDROM Auto Insert Notification of Win95 is dafault enabled, the system will continue to monitor your CDROM, auto-execute application when a CD diskette is loaded, and prevents the system from entering into suspend mode. To resolve this, go into Control Panel → System → Device Manager → CDROM → Setting, and disable the "Auto Insert Notification" function.

Q: What is Windows 95 Registry?

A: The functions of Windows 95 Registry and the Windows 3.1 INI files are almost the same. Both store the hardware and software configurations. The only difference is that Registry is a database while INI is text file. You can run REGEDIT.EXE to further understand the Registry structure. Checking and studying the structure of this file will help you solve some configuration problems.

Q: Which version of the Windows '95 that I am using?

A: You may determine the version of Windows '95 by following steps.

1. Double click "System" in "Control Panel".
2. Click "General".
3. Look for "System" heading & refer to following,

4.00.950	Windows 95
4.00.950A	Windows 95 + Service Pack or OEM Service Release 1
4.00.950B	OEM Service Release 2 or OEM Service Release 2.1

If you are running OSR 2.1, you may tell it from by checking "USB Supplement to OSR2" in the list of installed program of Add/Remove program tool under Control Panel, and checking for version 4.03.1212 of the Ntkern.vxd file in the Windows\System\Vmm32 folder.

Q: What is LDCM (LAN Desktop Client Manager)?

A: This is a software of Intel. The major goal is to provide an easy way for corporate network administrator to monitor the status of all the clients (workstation). You need at least DMI BIOS for LDCM. AOpen BIOS is also DMI ready but unfortunately, Intel LDCM needs Intel network card and ATI VGA to work properly. It is obviously not suitable for home user to pay LDCM extra cost.